

In accordance with the foregoing, claims 1-13 have been amended. A Version with Markings to Show Changes Made to the claims is included herewith. Care has been exercised to avoid the introduction of new matter.

Lyon relates to the division of a word, the extraction of a character from the word, and the recognition of the character. Moreover, Lyon performs character recognitions over characters extracted from a recognition target for the purposes of generating bounds model pairs to which the recognition target is compared.

Tsuruoka discloses a weighted direction index histogram method. The Examiner's assertions regarding claim 3, that Tsuruoka et al. discloses a one-dimensional gradating conversion, are respectfully traversed. The process associated with Tsuruoka et al. as shown in Fig. 3(b) and Fig. 4(b) involves the use of a two-dimensional Gaussian filter. More particularly, lines 13-14 in section 2.3 Realization, of Tsuruoka et al. reads "these sets of values given as weighting factors of filters respectively are in accordance to the 2-dimension space Gaussian distribution". Therefore, the foregoing section of Tsuruoka et al. indicates that in the Tsurouka apparatus, gradating conversion is performed in same direction as character connecting.

The combination, therefore, of Lyon and Tsuruoka is an apparatus which performs character recognitions over characters extracted from a recognition target for the purposes of generating bounds model pairs to which the recognition target is compared, using a 2-dimensional Gaussian distribution.

In contrast to the foregoing references relied upon, taken either alone or in combination, in the present invention, feature amounts of only candidate words are generated in the course of a recognizing process, as disclosed on page 8, at lines 3-5 of the present specification.

Each of independent claims 1 and 9-13 are amended to recite (using the recitation of claim 1 as an example) "referring to the list of at least one candidate word stored in said listing unit, dynamically generating a feature amount of only a candidate word registered in the list using the feature amounts of characters" stored in said dictionary unit during a recognition process for a recognition target, "which is not divided in units of characters".

Also in contrast to the foregoing references relied upon, the present invention avoids performing a gradating conversion in the direction in which characters are connected to each

other so that the feature amounts of respective characters contained in a word are assembled easily.

Moreover, claim 3 of the present application recites "an extracting unit performing a one-dimensional gradating conversion in a direction perpendicular to a connecting direction of characters for a direction code histogram of a contour line in each of a plurality of small areas in an inputted image provided that no gradating conversion is performed in the connecting direction of the characters, and extracting a direction code histogram series obtained from a conversion result as the feature amount of the recognition target".

In addition, dependent claims 2 and 4-8 recite patentably distinguishing features of their own. For example, claim 2/1 recites "said collating unit includes a memory storing the feature amount of the word, and releases the memory when a collation of the feature amount of the word is completed".

Withdrawal of the foregoing rejections is respectfully requested.

If there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

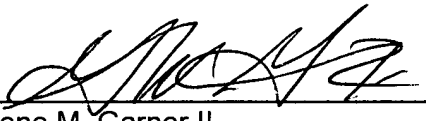
Respectfully submitted,

STAAS & HALSEY LLP

Date:

April 15, 2002

By:



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**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

**IN THE CLAIMS:**

Please AMEND the claims 1 and 9-13 as follows.

1. (THRICE AMENDED) A word recognizing apparatus, comprising:  
a listing unit storing a list of at least one candidate word;  
a dictionary unit storing feature amounts of a plurality of characters;  
a generating unit referring to the list of at least one candidate word stored in said listing unit, dynamically generating a feature amount of only a candidate word registered in the list using the feature amounts of characters stored in said dictionary unit during a recognition process for a recognition target, which is not divided in units of characters; and  
a collating unit collating the generated feature amount of the word with a feature amount of the recognition target, and outputting a recognition result.
- 2 (As Once AMENDED) The word recognizing apparatus according to claim 1, wherein said collating unit includes a memory storing the feature amount of the word, and releases the memory when a collation of the feature amount of the word is completed.
3. (AS TWICE AMENDED) The word recognizing apparatus according to claim 1, further comprising:  
an inputting unit inputting an image as the recognition target; and  
an extracting unit performing a one-dimensional gradating conversion in a direction perpendicular to a connecting direction of characters for a direction code histogram of a contour line in each of a plurality of small areas in an inputted image provided that no gradating conversion is performed in the connecting direction of the characters, and extracting a direction code histogram series obtained from a conversion result as the feature amount of the recognition target.
4. (As Once AMENDED) The word recognizing apparatus according to claim 3, wherein said extracting unit divides a length of the inputted image in the direction perpendicular

to the connection direction of characters by a predetermined integer and divides the image into the small areas with an obtained quotient as a size of each of the small areas.

5. (As Once AMENDED) The word recognizing apparatus according to claim 1, wherein said generating unit generates the feature amount of the word by using feature amounts of a plurality of characters.

6. (As Once AMENDED) The word recognizing apparatus according to claim 5, wherein said generating unit generates a new direction code histogram series by arranging a plurality of direction code histogram series corresponding to the feature amounts of characters composing the word and designating a generated direction code histogram series as the feature amount of the word.

7. (As Once AMENDED) The word recognizing apparatus according to claim 1, wherein said collating unit performs a non-linear matching of the feature amount of the word and the feature amount of the recognition target, and calculates a degree of similarity between the feature amount of the word and the feature amount of the recognition target.

8. (As Once AMENDED) The word recognizing apparatus according to claim 1, wherein said listing unit stores a list which has a high possibility of containing a word corresponding to the recognition target.

9. (THRICE AMENDED) A word recognizing apparatus, comprising:  
a generating unit referring to a list of at least one recognition candidate word, dynamically generating a feature amount of only a recognition candidate word registered in the list using feature amounts of characters during a recognition process for a recognition target, which is not divided in units of characters; and  
a collating unit collating the generated feature amount of the word with a feature amount of the recognition target, and outputting a recognition result.

10. (THRICE AMENDED) A recognizing apparatus, comprising:

a generating unit referring to a list of at least one recognition candidate pattern string, dynamically generating a feature amount of only a recognition candidate pattern string registered in the list using feature amounts of patterns during a recognition process for a recognition target, which is not divided in units of characters; and

a collating unit collating the generated feature amount of the pattern string with a feature amount of the recognition target, and outputting a recognition result.

11. (THRICE AMENDED) A computer-readable storage medium on which is recorded a program causing a computer to execute a process, said process comprising:

dynamically generating by referring to a list of at least one recognition candidate word a feature amount of only a recognition candidate word registered in the list using feature amounts of characters during a recognition process for a recognition target, which is not divided in units of characters; and

collating the generated feature amount of the word with a feature amount of the recognition target.

12. (THRICE AMENDED) A computer-readable storage medium on which is recorded a program causing a computer to execute a process, said process comprising:

dynamically generating by referring to a list of at least one recognition candidate pattern string a feature amount of only a recognition candidate pattern string registered in the list using feature amounts of patterns during a recognition process for a recognition target, which is not divided in units of characters; and

collating the generated feature amount of the pattern string with a feature amount of the recognition target.

13. (THRICE AMENDED) A recognizing method, comprising:

generating a list of at least one candidate pattern string;

generating a dictionary for storing feature amounts of a plurality of patterns;

dynamically generating by referring to the list of the at least one candidate pattern string a feature amount of only a pattern string registered in said list using feature amounts

of patterns stored in said dictionary during a recognition process for a recognition target, which is not divided in units of characters ; and

collating the generated feature amount of the pattern string with a feature amount of the recognition target.